

AN INQUIRY INTO NEW POSSIBILITIES  
IN INTAGLIO AND RELIEF PRINTS

by

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B. S., Kansas State University  
of Agriculture and Applied Science, 1951

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A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARTS

College of Architecture and Design

KANSAS STATE UNIVERSITY  
Manhattan, Kansas

1965

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## THE PROBLEM

This investigation of contemporary activity and methods in intaglio and relief prints was undertaken to see if the print was a useful art form in the twentieth century. The new methods that have been developed were compared with the classic form of the intaglio and relief print.

One necessary criterion was whether an artist could use the print creatively to communicate with his fellow man. This implied that those media had creative rapport for both the artist and the viewing public. The print would have to meet successfully the test of being a dynamic art form in our twentieth century civilization.

Considerable time was spent investigating contemporary techniques along with printing methods and adapting them for use in elementary and secondary schools. Inexpensive, effective methods of printing were sought to permit the inclusion of a graphics program in these schools without prohibitive costs.

Substitute materials were used in printing. Some of these materials were successful and others were not.

After a brief history of the print a criterion by which to judge the print was discussed. An explanation of the print techniques attempted and the results was presented. The etching techniques were considered first; the planographic second.

The print was found to be a usable, exciting twentieth century media and, with modification, easily adaptable for use in elementary and secondary school systems.

## HISTORY OF THE PRINT

The development of the etching began about 1504 when Daniel Hopfer etched the portrait of Kunz van der Rosen.<sup>1</sup> Hopfer was an armourer working in Augsburg. Armour (or armor) was decorated by an etching process, and it was a logical development that a print should be made from the incised and etched lines. Since this was a development from the decoration of armour, the first plates were of iron. Lucas van Leyden (1494-1533) was the first to use copper as a plate material. He was probably also the first to combine techniques. The portrait of Maximilian which he executed was a combination of engraving and etching, and then was finished with a burin.<sup>2</sup>

The Dutch and Germans developed the etching art to a high state in the 16<sup>th</sup> and 17<sup>th</sup> centuries. After the 17<sup>th</sup> century etching declined as an art form in the Low Countries. France was becoming the art center of the world and while some etching was done in France, it was in Italy and Spain that the great etchers of the 18<sup>th</sup> century flourished.<sup>3</sup>

The development of the photographic printing processes in the 18<sup>th</sup> and 19<sup>th</sup> centuries temporarily curtailed most of the development in graphics until the beginning of the 20<sup>th</sup> century.

Since Whistler interest in etching in America has been great.

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<sup>1</sup>Paul Beaujon, and others, Graphic Arts, p. 135. <sup>2</sup>Ibid., p. 136.

<sup>3</sup>Ibid., p. 142.



Among American etchers of great ability and international reputation were Joseph Penell, Frank W. Benson, Herman J. Webster, and Arthur W. Heintzelman.

The lithographic process was invented by Alois Senefelder in 1796.<sup>4</sup> The process was used extensively as a printing method for posters, books, and other literature. In France the lithographic art met with greatest success.<sup>5</sup> Goya in Spain and Winslow Homer of the United States held positions of prominence as lithographers in the mid 19<sup>th</sup> century. The lithograph giving way to etching lost its popularity about 1840. Development of the camera and photo-lithography took lithography away from the artist and gave it to the technician.<sup>6</sup>

A few strongholds of artistic lithography held out during the dark days of the middle 19<sup>th</sup> century. Adolf Menzel was working in Germany as was Manet in France. In the 1890's the Champ-de-Mars Salon opened its black and white section to the new school of lithographers. Among those who exhibited there were Toulouse-Lautrec, Steinlen, Odilon, and Cheret.

Since 1900 the lithographic center of activity has been in England.

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<sup>4</sup> Paul Beaujon, and others, Graphic Arts, p. 57. <sup>5</sup> Ibid., p. 58.

<sup>6</sup> Ibid., p. 60.

## CRITERIA FOR USE OF MATERIALS

Each material that has been used in a creative art process has had its own particular characteristics. An artist had to be sensitive to these materials so that he could use each material to the best advantage. He must have used his media creatively and selected the media which accomplished his desired end most honestly.<sup>1</sup>

Uses of materials changed as the culture in which they were used changed.

Demands of various cultures have constantly changed. As the culture developed, some concepts which had been adequate had to be revised as the society became more sophisticated.

The ancient Egyptians thought the sun to be a god called Rah. Rah made a daily trip across the heavens. This explanation of the sun and its existence was sufficient to meet the needs of ancient Egyptian society. However, as the scientific age dawned after the Dark Ages in Europe, the sun was thought to be a burning process. This combustion was believed to be similar to a coal fire which gave off heat energy. This concept was sufficiently accurate to have use in the medieval society. As late as 1940 a college text book used for engineering physics at K. S. U. only hinted at the possibility of a mass energy conversion. Recently the sun has been defined as a continuous mass-energy (thermo-nuclear) reaction.

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<sup>1</sup>Frank Seiberling, Looking into Art, p. 167.

This description was sufficient for the level of development of our society. As in each case cited from the past, if the current theory is in error it will be changed when a thermo-nuclear theory no longer meets the needs of our culture.

Creative uses of materials and the manner in which they were used have changed as creative man found new relationship between himself and his environment. Each new material offered creative possibility of use with older materials and techniques. With each synthesis of old and new not only were uses of new materials further understood, but old materials and techniques took on new meaning and potential. The creative artist had to be sensitive to new uses and possibilities in old materials when they were used in combination with new materials.<sup>2</sup>

Freedom of creative thought relied on the ease with which an artist used his media. Once he was relatively free of technical-mechanical aspects of his craft, he could devote all of his energies to his design. He searched constantly for new ways of using his materials by themselves and in combination with other materials. Recently many materials, some of which did not exist before this decade, have been tried in combination with more classic and traditional materials.

Table 1 shows a comparison of different graphic processes.<sup>3</sup>







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<sup>2</sup>Frank Seiberling, Looking into Art, p. 168.

<sup>3</sup>Jules Heller, Printmaking Today, p. xviii.



Table 1. A comparison of graphic arts mediums.

Process	Relief	Intaglio	Planographic
Common Name	(a) Woodcut (b) Wood Engraving	Etching Engraving Aquatint Drypoint, etc.	Lithography
Materials	(a) Plank-grain wood (b) End-grain wood, linoleum, etc.	Copper Zinc Plastics, etc.	Limestone Zinc Aluminum plates, etc.
Basic Tools	Knife Gouge Burin, etc.	Etching needles Burins Acids Grounds	Litho crayon Tusche Litho rubbing ink, etc.
Type of Press	(a) Household Tablespoon (b) Washington Press or Letter Press 	Etching press (Clothes-wringer type) 	Litho Press (sliding, scraping pressure) 
What Prints?	Prints what is left of the original surface 	Prints what is below surface of the plate 	Prints what is drawn on the surface 
Line	(a) Black line on white ground (b) White line on black ground	Etching--ends squared Engraving--swelling Drypoint-- soft, fuzzy	Crayonlike (granular) As with a pen As with a brush
Value	(a) Black or white	Greys obtainable through linear treatment or through aquatint, mezzo, etc. Wide range possible	Wide range of possibilities from delicate grey to rich black
Texture	(a) Grain of the wood block (e.g. pine could be utilized in the print)	Textures are man-made or man-controlled	Stone given a grain by lithographer prior to drawing. Unlimited textural possibilities



The collage presents the artist with a problem in the use of his media that the artist using more traditional materials does not have. Collage painting started in the middle ages as a family game. Families would gather together and stick bits of paper or cloth onto a panel. They would create a painting out of these scrap materials.

The next development in collage occurred when the cubists first painted paper, wooden, and stone textures into their compositions. Soon these artists were using actual bits of paper and wood by glueing them onto the painting surface.

Collage presents the artist with a very complex problem. Each of the materials he chooses to include in his design has its own particular properties as a media. Paper behaves in an entirely different manner than cloth. Each type of paper also behaves differently from others. They have different textures when crumpled or folded. They accept glue and paint differently. Some absorb liquids and become limp while others do not.

In using materials in a collage the artist found that a wealth of new and exciting transformations could be made. These new forms could not be created with the more classic media and therefore would present an art form that was unique and had artistic value in its own right. Transformations are the changes in space, texture, color, and form that an artist must make to change subject matter into symbols and then to use the symbols creatively. The problem of transformation did not exist in the non-objective approach to painting since no symbol was involved.

Red, weathered boards on the side of a barn could be represented as textured shapes by using pencil. Obviously the pencil would be creating a black and gray symbol which could convey to a viewer the idea of barn siding. Since the artist used a black and white medium, he deleted color in this transformation from a real object to a two dimensional shape. If he was painting he might have chosen to eliminate all other identifying characteristics of the barn except the red color. Once this transformation was decided upon any use of red could have indicated "barn" in the composition.

Transformations in the print involved consideration of what transformation the printing method would permit. A dry point would not accept a multicolor area treatment as well as a serigraph. Again, understanding the potential of the medium being used was of great importance. Dry point could accept the transformation to line and to shaded area with great beauty. The planographic process accepted a transformation into line or area in monochrome or, by the use of several stones, in color. A collograph using either soft ground etching or planographic methods permitted a wide variety of expression in both esthetic and physical transformation.

## THE INVESTIGATION

Soft ground etching and the planographic process were investigated during research on this problem. These were chosen for two reasons:

- 1.. They promised excellent opportunity for the development of experimental techniques in the collographic print.
2. They were chosen for possible development of printing methods that would be within the financial capability of most primary and secondary schools.

### I. SOFT GROUND ETCHING

The basic technique used in the intaglio part of the research was soft ground etching. A liquid ground, consisting of a mixture of benzine, lamp black paraffine, and mastic varnish was mixed in equal parts with a stiff grease used to lubricate automobiles. After a thorough mixing, a rubber brayer or roller was used to roll out this mixture onto a smooth metal surface. The benzine partly evaporated during rolling out and it was not difficult to get the feel of when a soft ground had about the correct consistency to be usable. Desired dryness was reached when the roller made a slight hissing sound as it rolled over the ink. Several tries were made to find this desired consistency. When it felt right the ground and grease were rolled onto a clean copper etching plate. The thickness of the ground found to be best was the one which deposited a very thin even coating and gave the plate a transparent



walnut colored tone.<sup>1</sup>

Soft ground is quite fragile. No tests were run to see how long a soft ground would remain in usable condition. Storage of a soft ground plate with ground applied would present a problem; therefore, the ground was made up when needed.

The plate may be drawn upon with any sharp or dull tool and the ground removed. A flat textured surface would remove the ground in the same textured pattern. Cloth, screen, paper, and other found art objects worked well. A transformation such as crumpling the material produced a combination of line and texture. Brushes were tried. Stiff brushes, such as used in oil painting, cut through the soft ground and were very successful. Brushes had to be cleaned after every stroke since they picked up the ground when they were drawn across it.

Many natural textures, leaves, grass seeds, and so forth, were tried and each one left its own intricate textured pattern.

The first plate that was bitten was a small zinc plate about 4" x 5". Several natural textures were pressed into the soft ground and then removed. When they were removed they took the soft ground with them. This in turn left the metal plate exposed. After a number of materials had been impressed and withdrawn, the plate was placed in a 20% solution of nitric acid for biting. As the acid reacted with the exposed part of the plate gas bubbles were formed. A very soft brush was used to remove these bubbles.

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<sup>1</sup>Jules Heller, Printmaking Today, p. 156.

A stiff brush would have removed the soft ground and permitted areas which should not be bitten to be attacked by acid. The depth of biting is in part determined by texture and closeness or wideness of separation of lines. Very delicate, closely spaced textures must not be bitten deeply or the acid would eat under the ground and cause a wide cavity. A textured area of line that was to be bitten lightly was stopped out by using vaseline or petroleum jelly before biting more deeply the darker areas and lines.

A number of successive bitings were used with any one grounding. After first grounding and biting, a proof was pulled. The plate was reground, reworked, and reetched as many times as the design and subsequent proofs indicated was necessary. Experiments also showed use of dry point at any stage of plate development was an excellent way of adding linear pattern and line accents. Figure 1 is a photograph of an etching produced by the methods described in this paragraph.

The hard ground was not tried in combination with subsequent or previous soft ground bitings.

After a proof was found to be satisfactory the edition was printed in the conventional manner with the use of an etching press.

Etching presses are very expensive and beyond the financial capability of many primary and secondary schools. For this reason, some other method of printing an etching was the next experiment attempted. An inexpensive method of printing which did not need a press could encourage primary and secondary schools to add etching to the art experience of their children.



Figure 1. The collagraph shown in this photograph was typical of the results obtained by using the soft ground technique.



A reference to plaster printing was found and this method was tried.<sup>2</sup> The same plate was used as had been used in a previous experiment with soft ground. A sheet of glass was cleaned and coated with a very fine film of light weight machine oil. Next a dam of plastic clay was constructed about two inches high and enclosing a space on the glass about six inches longer in each direction than the plate. The plate was inked with a lithographic ink instead of an etching ink. Etching ink did not print as well on the plaster as lithographic ink did. The ink mixture that seemed to work best was two-thirds ( $\frac{2}{3}$ ) lithographic ink and one-third ( $\frac{1}{3}$ ) burnt plate oil. The plate was inked in the usual manner with the use of a dauber instead of a roller with this ink. After the plate was inked and wiped, it was placed face up on the glass inside the clay dam.

Plaster was mixed in a ratio of two and three-quarters, ( $2 \frac{3}{4}$ ) pounds of plaster to one (1) quart of water. This mixture yields about eighty (80) cubic inches of plaster.<sup>3</sup> Enough plaster was mixed to cover the plate to a depth of over one (1) inch. Dry plaster was sprinkled into water and allowed to slake for five minutes. After slaking the mixture was stirred by placing a hand at the bottom of the mixing vessel and wiggling the fingers. This method of stirring keeps air bubbles to a minimum. It is the same method used in preparing plaster for ceramic molding processes. After

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<sup>2</sup>S. W. Hayter, New Ways of Gravure, p. 147.

<sup>3</sup>John B. Kenny, The Complete Book of Pottery Making, p. 68.

the plaster was thoroughly mixed it was allowed to stand until ready to pour, usually about ten (10) minutes.<sup>4</sup> Plaster and water must be poured onto the glass and allowed to flow over the etching plate. If a plaster mixture was poured directly onto the plate it washed off the ink.

Immediately after the plaster was poured the table upon which the glass was resting was given several sharp taps with a hammer. This vibrated the plaster and helped any trapped air bubbles rise through the plaster and away from the plate.

Several strips of cloth were imbedded in the plaster for additional strength. Two small wire loops were also imbedded with the loop sticking out. These were to use in hanging the print.

When the plaster had hardened the clay dam was removed and the plaster lifted from the glass. The etching plate was removed and the print examined. Figure 2 is a photograph of a plaster print made from the same plate illustrated in Figure 1, page 12.

The print proved to be of excellent quality. It had rich blacks and the texture was enhanced by the plaster which produced a relief of the intaglio plate.

This relief effect in plaster indicated another type of printing might be attempted.<sup>5</sup> Another plaster print was cast. The only difference in casting was that the clay dam was moved in so that it touched the plate. This left no border around the print.

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<sup>4</sup>John B. Kenny, The Complete Book of Pottery Making, p. 66.

<sup>5</sup>S. W. Hayter, New Ways of Gravure, p. 264.



Figure 2. Photograph of a plaster print cast from the same plate used to make Fig. 1. White linear pattern was added after the print was made.



The print was locked in a job press and a print was attempted from the plaster relief. The plaster was too soft for the pressures of the job press and it broke. Next, an epoxy resin relief casting was made. The plate was coated with light weight oil to prevent the epoxy from sticking to it. The epoxy warped in setting up so no successful print was made by using this process.

Even though the last two experiments were failures the straight plaster print was a success and was a usable method to reproduce etchings when a regular press was not available. Furthermore, the plaster print may be carved upon after printing and in this manner a white line pattern was developed on the rich black of the print.

This gave the artist opportunity to work with light as well as dark line and patterns on the same print. The scratched-in white pattern could be used differently on different prints and this would permit many variations in the finished print.

## II. PLANOGRAPHIC PROCESS

The planographic process was the next graphic art form which was investigated.

Brown, in the Scammon Lectures at the Art Institute of Chicago, suggested that some differentiation should be made between the various planographic methods.<sup>6</sup> He suggested use of the word "crayon-stone" as being definitive of the process.<sup>7</sup> Crayonstone within his concept meant drawing on a lithographic stone with a greasy

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<sup>6</sup>Bolton Brown, Lithography for Artists, p. 5. <sup>7</sup>Ibid., p. 11.

crayon. It seemed desirable to differentiate between the stone, photoplanographic processes, and others which could be classified broadly as planographic processes.

This investigation limited itself to the lithographic crayon-stone concept.

Limestone used for this process was of three types: blue and gray limestones which were found at the Solenhofen quarries in Bavaria and yellow stones which were quarried in almost any limestone quarry in the world.<sup>8</sup>

Blue and gray stones were used for finest work and most delicate shading. They were found to be extremely dense. Yellow limestone was much softer and prints which were made from yellow stone were softer and less exact in their appearance. Even though prints from the blue and gray stones were preferred, there was a certain charm found in the diffuse results which were obtained from the yellow stone.

Since a conventional lithographic press was not available the problem of printing from a stone or plate by substitute methods had to be solved. Successful prints were made from a stone and plate with a modified blanket approach much as in the printing of an intaglio plate. A second method of printing was also successful by using a spoon in the manner usually associated with relief printing.

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<sup>8</sup>Bolton Brown, Lithography for Artists, p. 11.

Many variations in planographic processes were found in references.<sup>9</sup>

The four basic steps in producing a lithographic print were these:<sup>10</sup>

1. Graining the stone.
2. Drawing or clarifying the pictorial idea.
3. Etching the stone.
4. Proving the stone.

Graining accomplished three things. It removed any old design which was on the stone. It made the stone grease sensitive, and it provided a tooth on the stone's surface upon which to draw.

When the stone was drawn upon with a greasy crayon, or when grease in any form was placed on the grained surface, that part of the surface became sensitive to an oil base ink.

The stone was etched with a weak solution of nitric acid. About thirty (30) drops of chemically pure nitric acid were added to one and one-half ( $1\frac{1}{2}$ ) ounces of a saturated gum arabic solution.<sup>11</sup>

The etch made the drawing permanent and the remaining surface of the stone no longer sensitive to grease.

The dampened stone was inked and a sheet of dampened paper was placed against the inked side of the stone. Three layers of felt etching blanket were placed on top of the paper. This was run

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<sup>9</sup>Bolton Brown, Lithography for Artists, 102 pp.; Jules Heller, Printmaking Today, 206 pp.

<sup>10</sup>Heller, op. cit., p. 4.

<sup>11</sup>Ibid., p. 14.



through a roller press.

After basic lithographic processes were developed a collographic impression was attempted on stone. Various cloths were saturated with lithographic tusche and allowed to dry. A landscape type form was decided upon. The dried saturated cloths were ironed onto a grease sensitive stone with a hot flat iron. It was supposed that grease would become soft and be impressed upon the surface of the stone. Little transfer from these collage materials was obtained. After etching and proving the stone the transfer was found to be weaker than expected. In some areas several different textures were ironed on and instead of each texture transferring to the stone and darkening the design, it was found that some of the previously applied design was removed from the stone.

This endeavor did not prove so successful as expected and a different approach to collographic transfer was attempted.

Textural surfaces, cloth, paper, sponges, etc., were dipped in liquid lithographic tusche and squeezed until most of the tusche was removed. These textures were pressed several times on newsprint paper until the density of tone appeared to be the same as the density desired in the print. When this density was reached the textured material was then blotted on to the stone. Successive transfers were made on the same areas to build either textural interest or tonal intensity. When this stone was proved the results were rich in tone and texture, and a method of producing a collograph on lithographic stone had been found. Figure 3 shows a painting of a landscape motif and Figure 4 is a picture of the



Fig. 3. A photograph of a painting based on a landscape motif. This motif was then used as basis for the collograph shown in Fig. 4.



Fig. 4. The collograph using the motif of the painting shown in Fig. 3.

collo lithograph based on the painting. Transfer was tried in combination with crayon and direct application of lithographic tusche. All three methods of application were found to be compatible and use of several techniques on the same stone enriched the print taken from it.

A grease sensitive zinc metal plate especially prepared for the lithographic process was tried next. An etching solution for the zinc plate was made of three (3) ounces of saturated gum arabic solution, one and one-half ( $1\frac{1}{2}$ ) ounces of saturated potassium bichromate, and one-eighth ( $1/8$ ) ounce of phosphoric acid.<sup>12</sup> The proof was much the same as that from the stone. Transfer of cloth textures by heat was tried and was not successful. Some materials that were treated with lithographic tusche picked up previously applied textures. This pick-up gave interesting and unexpected textures. However, a complete experiment of lightening areas in this way was not undertaken. Dipping of materials, blotting and transferring to the metal plate worked as well as it had on the stone. Two other desirable characteristics of the plate were noticed. The metal plate took pressure of the roller press printing technique without any danger of being destroyed by cracking or crumbling and they were much lighter to handle and store.

Limestone from Junction City, Kansas, area was tried as a lithographic stone. Kansas limestone differed from Bavarian and commercial yellow stones in several ways. Kansas stone was not nearly

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<sup>12</sup> Jules Heller, Printmaking Today, p. 37.



so dense and was full of small pits, fossils, and imperfections. It was much softer than even the softest of the yellow printing stones. Density of tone in the print increased with successive inkings and was much slower than had been experienced before. Plate I on page 23 shows the build up of tone on successive inkings. Figure 5 is the first proof, Figure 6 is the third, and Figure 7 is the fifth. Small pits and fossils in the stone added textural variety which was interesting. Except for these differences the Kansas stone behaved just as the previous stones had in printing.

Because of its soft texture small pieces of the stone began to lift away from the stone's surface on the fifth print. Too much pressure was applied by the press and one end of the stone broke on the sixth proof. In an attempt to overcome these difficulties a spoon print was attempted. The stone was inked in the usual way, damp paper applied, and a large tablespoon was rubbed briskly over the paper. A good proof was pulled by this method. Spoon printing gave the printer ability to control various areas of the proof in much the same manner as a printer does in printing a relief print. Kansas stone edges were gently beveled and it has been suggested that if the stone was bound on the sides it might not break so easily. Figure 8 was a proof made by the spoon method after the stone fractured in the press.

Limestone differs from plaster of Paris by one water molecule. A print was tried by using a plaster "stone". No successful results were obtained. The plaster block accepted ink over its entire sur-



Fig. 5. First proof.



Fig. 6. Third proof.



Fig. 7. Fifth proof.



Fig. 8. Proof of lithographic stone  
printed by spoon-  
rubbing technique.

Figures 5, 6, & 7. The slow build up of tone with successive inkings.

face and the design placed on the block did not appear in the proof.

A number of possibilities of combinations of techniques and results were possible. Use of watercolor with a lithographic print offered opportunity to introduce color into the print without using a multistone process. Furthermore, since watercolor was painted onto the stone before each proof, a wide variety of color possibilities were tried. For best results the vehicle used was sugar, gum arabic, and water.

After the stone was inked watercolor was applied to the stone in areas desired. Quickly dampened paper was applied and the proof drawn. Grease in the ink acted in such a manner that the watercolor was contained in areas bounded by ink. A slower travel through the press than used with the regular print was necessary. If the stone was rolled through too rapidly, watercolor was pushed ahead of its defined area and ran into areas where no color had been anticipated. After each print the stone was washed with clear water. Use of watercolor did not injure regular printing quality of the stone. Figures 9 and 10 on the following page display experiments using watercolor painted directly on the stone.

The color gave the print a decorative quality. However, color did not add to the print in terms of print quality.

There were other possibilities that were not investigated. Some of these were mixtures of intaglio, planographic, relief, and serigraphic techniques. These mixtures would permit a great variety in the fine art print.





Fig. 9 Results obtained when water color  
& was brushed onto the stone immed-  
Fig. 10 iately before the plate was printed.



Fig. 10

Another problem which was not investigated but was similar to the type of research which had been done was a collage of prints.

## CONCLUSIONS

The print experiments were exciting. Combinations of old and new techniques gave a vitality and interest to the prints that was not evident in more classic and traditional handling. Each of the print forms that were tried was interesting, and good results came from combinations of various print methods and with deviation from the classic form.

In past conversations with art instructors the attitude toward the print was that it was excellent for the eighteenth and nineteenth centuries but that graphic form did not excite or interest them as a twentieth century medium. Furthermore, most of the artists and art instructors felt that a graphics program was excessively expensive because of the number of presses necessary for a sound program. Also, they were hesitant to undertake teaching in an area which is supposedly technically very difficult and exacting.

During this investigation the print was found to be anything but an archaic and uninteresting form. Exciting results were obtained by using new materials in combination with older forms of the print. After viewing each experimental result a number of possibilities for further development was obvious. Time and concept of this research did not permit full investigation of these many experiments. The contemporary print form was found to be dynamic and certainly in keeping with 20<sup>th</sup> century creative endeavors.

Any one of the experiments which were tried could have offered,



if studied in depth, a long and satisfying art development. The way in which any individual used materials and techniques available to him would make this a very personal method of expression.

Even though techniques were exacting in the classic form, it was found that the print permitted a great deal of latitude and deviation from methods described in most references. Many of the references warned that exact methods had to be followed. This was not true. Once one had a complete understanding of the processes involved and of why the process worked he would then be able to build new techniques on this knowledge. A thorough understanding of each process was necessary before liberties could be taken with the method.

This basic understanding was not at all restrictive as far as the creative use of the print form was concerned. It was just as necessary as with any other art form. Technique, the proper use of the materials, and an understanding of their limitations were necessary disciplines before the artist could be free to use these tools creatively. Development of a Kansas limestone lithographic print could not have been accomplished without first being aware of how a lithographic process should work.

Several unorthodox but nevertheless usable methods of printing both intaglio and planographic prints were developed. These methods, plaster print from the intaglio plate and spoon rubbing from the lithographic stone, would permit primary and secondary school art departments to explore more sophisticated print forms. Since no

printing press was used in these two examples, cost of a graphics program would not be excessive.

Results of this part of the research removed most objections that had been voiced as reasons to oppose use of graphics as part of the art experience in a well rounded art program. The necessary disciplines of technique would be of value to the art student. In the Department of Art at the Dickinson County Community High School some of these methods have been tried with secondary school children and results were excellent. High school students found the technical part of print making interesting.

The unorthodox printing methods developed for the planographic process have been in use for over a year with good results. Some students have developed a rapport with the print that will enrich their art appreciation for the rest of their lives.

## ACKNOWLEDGMENT

Grateful thanks go to Dr. John F. Helm, Jr., for his help and encouragement during the research for this problem, and for the many years of friendly guidance and help he has given to me as an undergraduate student, and graduate student.



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AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARTS

College of Architecture and Design

KANSAS STATE UNIVERSITY  
Manhattan, Kansas

1965

This study was undertaken to investigate some of the contemporary print techniques to find and test simple methods of printing which would not demand use of an expensive etching or lithographic press.

Two print methods were investigated. They were the intaglio and the lithographic methods.

During the intaglio investigation soft ground etching and collograph were used. A method for proofing which used a plaster of Paris relief print was explored. The plaster method worked well and is within the capability of any school art department. The plaster method was not original with this investigation but was suggested in several references.

Lithographic investigation used blue Bavarian litho limestone, yellow commercial lithostone, zinc plates, Kansas limestone, and plaster as the stone. Successful results were obtained except for the plaster stone which did not work at all. Kansas limestone, if handled properly, produces excellent results. However, it is very fragile in comparison with other stones. Special physical treatment of the stone was necessary.

A method of applying collographic designs was discovered which was believed to be original. Most of the lithographic prints were printed on a roller press. However, a simpler and less expensive method used a spoon to press paper onto an inked surface. This is the same method used frequently for proofing the relief print. The spoon method of lithographic proof would permit most schools to include lithography in their art offering.



The print and methods of production of prints were included. It was hoped that this would result in a better understanding of the print processes by those who are not familiar with graphic art.

The problem of transformation in painting and the print was discussed. Examples of transformations, both esthetic and physical, were presented. The transformations peculiar to the print, and the differences between them and those adaptable to painting concluded the section on transformations.

As a result of this investigation the contemporary print was found to be a dynamic and highly adaptable art form. Some of the methods described in this paper have been in use for over a year at the high school level. Therefore, they are known to work.

I hope that this research will bring a better understanding to those interested in the contemporary print and its possibilities.